

Claims

- [1] A III-nitride compound semiconductor light emitting device comprising an active layer with the multi-quantum wells interposed between an n-In_xAl_yGa_zN ($x+y+z=1$, $0 \leq x < 1$, $0 \leq y < 1$, $0 < z \leq 1$) layer and a p-In_xAl_yGa_zN ($x+y+z=1$, $0 \leq x < 1$, $0 \leq y < 1$, $0 < z \leq 1$) layer, wherein the active layer comprises an alternate stacking of a quantum-well layer made of In_xGa_{1-x}N ($0.05 < x < 1$) and a sandwich barrier layer, the sandwich barrier layer comprising a first outer barrier layer of In_aGa_{1-a}N ($0 < a \leq 0.05$), a middle barrier layer of Al_yGa_{1-y}N ($0 \leq y < 1$) formed on the first outer barrier layer and a second outer barrier layer of In_bGa_{1-b}N ($0 < b \leq 0.05$) formed on the middle barrier layer, and wherein the middle barrier layer has a bandgap energy greater than those of the first and second outer barrier layers.
- [2] The III-nitride compound semiconductor light emitting device of Claim 1, wherein the quantum-well layers are equal to or below 60 Å in thickness, and the sandwich barrier layer is equal or below 300 Å in thickness, and the ratio of the sum of the thickness of the first outer barrier layer and the thickness of the second outer barrier layer, (t1), to the thickness of the middle barrier layer, (t2), i.e., t1/t2, is 1/50 to 1/2.
- [3] The III-nitride compound semiconductor light emitting device of Claim 1, wherein the lowest layer of the active layer, which is in contact with the n-In_xAl_yGa_zN layer, is the first of the quantum well layers made of In_xGa_{1-x}N, and the uppermost layer of the active layer, which is in contact with the p-In_xAl_yGa_zN layer, is the last of the quantum well layers made of In_xGa_{1-x}N.
- [4] The III-nitride compound semiconductor light emitting device of Claim 1, wherein the lowest layer of the active layer, which is in contact with the n-In_xAl_yGa_zN layer, and the uppermost layer of the active layer, which is in contact with the p-In_xAl_yGa_zN layer, are composed of the middle barrier layer of the sandwich barrier layer.